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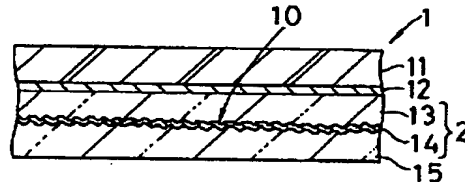
(54) 【発明の名称】 ホログラム転写シート

(57) 【要約】

【課題】 偽造、変造がされ難いホログラム層を被転写体上に形成できるホログラム転写シートを提供すること。

【解決手段】 このホログラム転写シート1は、基材11、剥離層12、ホログラム形成層13、光反射層14及び接着層15とでその主要部が構成されている。そして、カード等の被転写体に対しこのホログラム転写シートを用いサーマルヘッドにより『A. O』パターン等任意形状のホログラム層（ホログラム形成層13及び光反射層14から成る）2を形成することが可能となる。従って、形成されたこのホログラム層2を剥がしかつ従来の透明型ホログラムシートを用いてIDカード等の改ざんを試みたとしても、事前に形成された固有形状の上記ホログラム層2を被転写体に再度形成することは困難なため、上記改ざんを確実に防止できる効果を有する。

- 1: ホログラム転写シート
- 2: ホログラム層
- 10: 凹凸パターン
- 11: 耐熱性基材
- 12: 剥離層
- 13: ホログラム形成層
- 14: 光反射層
- 15: 接着層



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Applicant: Toppan Printing Co., Ltd.

Abstract

Objective

To provide a hologram transfer sheet for forming a hologram layer which is difficult to forge or alter, on a subject which will receive the hologram layer.

Means for Solving the Problem

The hologram transfer sheet 1 comprises, as a main body, a base material 11, a release layer 12, a hologram forming layer 13, a light reflection layer 14 and an adhesive layer 15. Using the hologram transfer sheet, a hologram layer (comprising the hologram forming layer 13 and the light reflection layer 14) having an arbitrary shape such as characters "A. O" can be formed using a thermal head on a subject such as a card. Accordingly, even if falsification of an ID card, or the like, is attempted by peeling off the formed hologram layer 2 and by using a conventional transparent-type hologram sheet, it is difficult to form the above-mentioned hologram layer 2 having the previously formed unique shape on the subject. Thus, the present invention exerts an effect of reliably preventing the above-mentioned falsification.

CLAIMS

1. A hologram transfer sheet having a hologram layer, the arbitrary shape of which can be transferred by heating the same by a heating means capable of selectively heating the arbitrary shape.

2. The hologram transfer sheet according to claim 1, wherein a hologram pattern of said hologram layer is a machine-readable pattern.

3. The hologram transfer sheet according to claim 1, wherein a hologram pattern of said hologram layer is defined by a projection pattern through which monochromatic light incident upon a hologram layer is transmitted to form a visible image onto a screen.

4. The hologram transfer sheet according to claim 1, 2 or 3, wherein the heating means for selective heating an arbitrary region comprises a thermal head provided with a plurality of heating elements.

[Detailed Description of the Invention]

[0001]

[Technical Field to which the Invention Pertains]

The present invention relates to a hologram transfer sheet for forming a hologram layer upon a subject which will receive the hologram layer such as an ID card, a bill or a stock certificate.

[0002]

[Prior Art]

As an ID card such as a credit card and a member's card, a card provided with a portrait "a" (see Fig. 1), etc. as a unique information, is widely known.

[0003]

However, a card having a constitution like the above was difficult to distinguish from a card falsified by replacing the portrait "a".

[0004]

Thus, recently, a countermeasure to prevent the falsification has been taken by putting a transparent-type hologram sheet (see Kokai 61-254975) on a surface of the portrait "a" on the card so that a hologram pattern b can be

recognized together with the portrait a (see Fig.6).

[0005]

[Problems to Be Solved by the Invention]

However, the above countermeasure, in which the card having the portrait "a" and the transparent hologram sheet are made of separate pieces, is not sufficient to prevent the falsification effectively because the transparent-type hologram sheet can be peeled off to replace the portrait a and a similar transparent-type hologram sheet can be put on the card to reconstruct the card.

[0006]

The present invention was accomplished to overcome the above-mentioned problem and has a purpose to provide a hologram transfer sheet capable of forming a hologram layer, which is difficult to forge or alter, on a subject.

[0007]

[Means to Solve the Problem]

That is to say, a hologram transfer sheet of the invention of claim 1 is provided with a hologram layer, the arbitrary shape of which can be transferred by heating the same by a heating means capable of selectively heating the arbitrary shape.

[0008]

By using the hologram transfer sheet, a hologram layer having an arbitrary shape can be formed on a subject. Thus, it is possible to form a hologram layer having a unique shape, for example, a shape indicating the properties of the subject can be formed thereon.

[0009]

Accordingly, falsification of, for example, an ID card can be reliably prevented because it is difficult to reconstruct the hologram layer having the previously formed unique shape on the subject.

[0010]

An example of a specific constitution of the hologram transfer sheet of the invention according to claim 1, may be a main body comprising a heat-resistant base material having

a thickness of about $2\mu\text{m}$ to $25\mu\text{m}$ and comprising polyethylene terephthalate, polyethylene naphthalate, polyamide, polycarbonate, etc. ; a release layer provided on the heat-resistant base material, which comprises a thermoplastic acrylic resin, a chlorinated rubber resin, a mixture of the chlorinated rubber resin and nitrocellulose, acetylcellulose, cellulose acetate butylate, polystyrene or chlorinated polyvinyl acetate resin, etc.; a hologram forming layer provided on the release layer, which has a uniform convex-concave pattern corresponding to the hologram pattern on a surface opposite to the release layer; a light reflection layer uniformly formed on the surface with the convex-concave pattern of the hologram forming layer; and, an adhesive layer provided uniformly on the light reflection layer, which comprises an acrylic resin, a polyester resin, a vinyl resin, etc.

[0011]

As a material for the hologram forming layer, there may be used, for example, an acrylic resin, a urethane resin, a cellulose acetate resin, a nitrocellulose resin, etc. Examples of a material for the light reflection layer include a metal such as aluminum or tin which can be formed into a membrane by vacuum deposition, sputtering, ion plating, etc. and a transparent material which can be formed into a membrane by EB deposition, sputtering, reactive sputtering, ion plating, etc., and which has a reflection factor greater than that of the material for the hologram forming layer, such as Sb_2S_3 , Fe_2O_3 , TiO_2 , CdS , CeO_2 , PbCl_2 , CdO , Sb_2O_3 , Bi_2O_3 , ZnS , WO_3 , SiO , In_2O_3 , PbO , Ta_2O_3 , ZnO , $\text{CaO}\cdot\text{SiO}_2$, ZrO , Cd_2O_3 , Al_2O_3 , etc. When a metal is used for the light reflection layer, a light reflective-type hologram is produced and when the transparent material is used, a light transparent-type hologram is produced.

[0012]

Next, the hologram layer (comprising the hologram forming layer and the light reflection layer) to be transferred to the subject may be in any shape. For example, when the subject is

an ID card, the pattern to be transferred can be defined by letters (alphabet, numeral, Hiragana, Katakana, Kan-ji, etc.) representing initials, age, member's ID number, etc. of a card owner. When the subject is a certificate, a stock certificate, etc., the transferred layer may have a shape of a mark and a bar-code pattern.

[0013]

The hologram pattern of the hologram layer may be of any kind. However, those of a high optical security, such as a rainbow hologram, a Fourier transform super hologram and a grating image (which is obtained by aligning grids and adjusting the recoding of stripes of the grids to make a stereogram) is preferred. Also, any conventionally known method, for example, a laser method and EB drawing method, can be used for forming the pattern. The invention according to claim 2 or 3 relates to inventions wherein the kind of the hologram pattern of the hologram layer is specified.

[0014]

Namely, the invention according to claim 2 is based on the hologram transfer sheet according to claim 1 and is characterized in that the hologram pattern of the hologram layer is a machine readable pattern. The invention according to claim 3 is characterized in that the hologram pattern of the hologram layer is a projection pattern through which monochromic light incident upon a hologram layer is transmitted to form a visible image onto a screen.

[0015]

In the hologram transfer sheet according to claim 2, the hologram pattern of the hologram layer comprises a machine readable pattern such as a bar-code or a Calra code, which is not readable by the unaided eye and whose contents can be recognized only by a reader. In the hologram transfer sheet according to claim 3, it is difficult to forge or alter the hologram transfer sheet for forming the hologram layer because the hologram pattern of the hologram layer comprises a projection pattern capable of forming a visual image by

projecting a monochromic light entering into the hologram layer on a screen. Also, it is difficult to forge or alter the shape of the hologram layer itself which is transferred to the subject. Accordingly, it is possible to effectively prevent the forgery or alteration of ID cards, bills, stock certificates, etc.
[0016]

The hologram pattern of the hologram layer can be formed by forming a Fourier transform super hologram. When the hologram layer transferred onto the subject is irradiated with white light, the hologram pattern of the hologram layer cannot be reproduced or observed by the unaided eye and only a transferred pattern of a rainbow-colored hologram layer itself is recognized. On the other hand, when monochromic light such as an optical laser is applied, the hologram pattern recorded in the hologram layer can be reproduced and observed by the unaided eye. Namely, in the hologram transfer sheet of claim 2, the pattern such as the bar code, is observable by the unaided eye and is machine readable. In the hologram transfer sheet of claim 3, characters and graphic patterns are projected on a screen.
[0017]

The heating means used for selectively heating an arbitrary region of the hologram transfer sheet of claims 1 through 3 may be any means such as a heat disk and laser, however, a thermal head is preferable as the hologram layer having a shape specific to a subject can be conveniently formed using the same. The invention of claim 4 relates to an invention in which the heating means is specified.
[0018]

Namely, the invention of claim 4 is based on the hologram transfer sheet of the invention described in claims 1, 2 or 3 and is characterized in that the heating means used for selectively heating an arbitrary region comprises a thermal head having a plurality of heating elements.
[0019]

Concrete examples of the subject on which a hologram layer

in an arbitrary shape is transferred and formed using the hologram transfer sheet of the present invention include a stock certificate, a check, a label, a stamp, a bill, a certificate, a bankbook, a boarding ticket and a theater ticket, an ID card such as a cash card, a credit card, a prepaid phone card, a member's card, an IC card and an optical card, a passport and a ticket.

[0020]

[Mode for Carrying Out the Invention]

The mode for carrying out the present invention is hereinafter illustrated referring to the drawings.

[0021]

First, a hologram transfer sheet 1 has a main body comprising a heat-resistant base material 11 having a thickness of $25\mu\text{m}$ and comprising polyethylene terephthalate; a release layer 12 having a thickness of $1.5\mu\text{m}$, which is formed by coating a composition for a release layer described below according to gravure printing, followed by drying at a temperature of 110°C ; a hologram forming layer 13 having a thickness of $2.0\mu\text{m}$, which is formed on the release layer 12 by coating a composition for a hologram forming layer according to gravure printing, followed by drying at a temperature of 110°C , and on which a convex-concave pattern 10 of a Fourier transform super hologram is formed by heat-pressing a nickel hologram stamper with a hologram pattern at a printing surface temperature of 165°C ; a light reflection layer 14 of ZnS having a thickness of about 80nm, which is formed into a membrane on the hologram forming layer 13 by vacuum deposition; and an adhesive layer 15 having a thickness of $1.5\mu\text{m}$, which is formed by coating a composition for an adhesive layer according to gravure printing followed by drying at a temperature of 110°C .

[0022]

In the hologram transfer sheet, the hologram pattern of the hologram layer 2 comprises a projection pattern through which a visible light laser incident upon the hologram layer 2 is transmitted to form a character pattern of "OK" onto a screen.

Accordingly, when the hologram layer 2 is irradiated with white light, the character pattern is not reproduced but the layer merely exhibits colors of the rainbow.

(composition for release layer)

Acrylic resin	30 parts by weight
Toluene	40 parts by weight
Methylethylketone	40 parts by weight
Methylisobutylketone	20 parts by weight

(composition for hologram forming layer)

Mixture of vinylchloride-Vinylacetate copolymer and urethane resin	25 parts by weight
Methylethylketone	70 parts by weight
Toluene	30 parts by weight

(composition for adhesive layer)

Polyester resin	30 parts by weight
Methylethylketone	50 parts by weight
Toluene	50 parts by weight

Next, the hologram transfer sheet was laminated on a card 3 comprising polyvinylchloride and having a surface provided thereon with a portrait pattern, with the adhesive layer 15 opposing to the card (see Fig.2A). By heating from the side of the base material 11 of the hologram transfer sheet 1 with a thermal head 4, the transfer sheet layers except for the base material 11, i.e., the release layer 12, the hologram forming layer 13, the light reflection layer 14, and the adhesive layer were partially transferred (see Fig. 2B). Thus, a hologram layer 2 having the character pattern of "A.O", which comprises two layers, the hologram forming layer 13 and the light reflection layer 14, is formed on the portrait pattern of the card 3 as shown in Fig.3.

[0023]

When an optical light laser is applied on the hologram layer 2 of the card 3, the hologram pattern of "OK" is projected on a screen 6 through lens 5 as shown in Fig. 4.

[0024]

On the other hand, when the hologram layer 2 of the card 3 is irradiated with white light, the hologram pattern is not reproduced and the character pattern "A.O" which is the shape of the hologram layer 2 itself is rainbow-colored.

[0025]

As the material for the card, polyvinylchloride may be replaced with polyethylene terephthalate and the adhesive strength of the multilayer may be improved by providing an adhesive layer on the card surface on which the hologram layer is transferred.

[0026]

When the hologram layer is formed on a subject other than cards, the subject may comprise paper, etc. in addition to the resin material.

[0027]

[Effect of the Invention]

According to the hologram transfer sheet, of the invention described in claim 1, having the hologram layer, the arbitrary shape of which can be transferred by heating the same by a heating means capable of selectively heating the arbitrary shape, a hologram layer of an arbitrary shape can be formed on a subject using the hologram transfer sheet so that, for example, a hologram layer having a unique shape indicating properties of the subject can be formed thereon.

[0028]

Accordingly, even if forgery of an ID card, etc., is attempted by peeling the formed hologram and by using the transparent-type hologram sheet, the forgery may be prevented reliably because it is difficult to reconstruct the previously formed hologram layer having a unique shape, on the subject.

[0029]

Next, according to the hologram transfer sheet of the invention described in claim 2, the hologram pattern of the hologram layer comprises a machine readable pattern such as a bar-code or a Calra code, which is not readable by the unaided

eye and whose contents can be recognized only by a reader. According to the hologram transfer sheet of the invention described in claim 3, it is difficult to forge or alter the hologram transfer sheet for forming the hologram layer because the hologram pattern of the hologram layer comprises a projection pattern capable of forming a visual image by projecting a monochromatic light entering into the hologram layer on a screen. Also, it is difficult to forge or alter the shape of the hologram layer itself which is transferred to the subject. Accordingly, it is possible to reliably prevent the forgery or alteration of an ID card, a certificate, a stock certificate, etc.

[0030]

Also, according to the hologram transfer sheet of the invention described in claim 4, which is characterized in that the heating means capable of selectively heating an arbitrary region comprises a thermal head provided with a plurality of heat generating element, a hologram layer in a shape specific to a subject can be conveniently and reliably formed.

[Brief Explanation of Drawing]

[Fig.1] A sectional view showing the constitution of the hologram transfer sheet of an embodiment of the present invention

[Fig.2] Fig.2(A) is an illustration of the process for forming a hologram layer on a subject using the hologram transfer sheet. Fig.2(B) is a sectional view of the subject on which the hologram layer is formed.

[Fig.3] A plan view of the subject on which the hologram layer is formed.

[Fig.4] An illustration of a method for reproducing a hologram pattern of the hologram layer formed on the subject.

[Fig.5] A plan view of an ID card of a prior art.

[Fig.6] A plan view of an ID card of an improved prior art.

[Description of the Symbols]

1. hologram transfer sheet

2. hologram layer
3. card
4. thermal head
6. screen
10. convex-concave pattern
11. heat-resistant base material
12. release layer
13. hologram forming layer
14. light refraction layer
15. adhesive layer

[Fig.1]

1. hologram transfer sheet
2. hologram layer
10. convex-concave pattern
11. heat-resistant base material
12. release layer
13. hologram forming layer
14. light refraction layer
15. adhesive layer

[Fig.2]

[Fig.3]

Member's Name

Member's ID number

[Fig. 4]

[Fig.5]

Member's Name

Member's ID number

[Fig.6]

Member's Name

Member's ID number

Translator's note: The Japanese text of JPP'616 is partly indefinite. Our translation was intended to convey the meaning thereof.